

# Introduction to Energy & Power

Course Code: 20101

## Rationale Statement:

Introduction to Energy& Power is used every day in many different ways. To become a more environmentally friendly society, students will have a basic understanding of the various types of energy and how energy is obtained. Everyone should know what energy sources are available that do not pollute the environment and how this energy can be converted into a useful power supply.

**Suggested Grade Level:** 9-10

## Topics Covered:

- History and effects on society
- Relationship between work, energy, and power
- Transmission of power
- Alternative power
- Safety

## Core Technical Standards & Examples

Indicator #1: Analyze the history of energy/power sources	
Bloom's Taxonomy Level	Standard and Examples
Analyzing	<b>EP.1.1 Examine the historical development of energy/power production</b> <i>Example:</i> <ul style="list-style-type: none"><li>• Develop a timeline depicting the development of engines</li><li>• Write a paper on a famous inventor</li><li>• Give an oral report on the development of a power system</li></ul>
Analyzing	<b>EP.1.2 Assess the impact of energy/power on the way we live and work</b> <i>Example:</i> <ul style="list-style-type: none"><li>• List various energy sources and machines used prior to the 21<sup>st</sup> century</li><li>• Select an invention and write a short paper describing its impact on society, both positive and negative</li></ul>

	<ul style="list-style-type: none"> <li>Examine how the past use of energy and machines has negatively impacted our planet</li> </ul>
<b>Indicator #2: Examine the relationship between work, energy, and power</b>	
<b>Bloom's Taxonomy Level</b>	<b>Standard and Examples</b>
Understanding	<b>EP.2.1 Define work, power, and energy</b> <i>Example:</i> <ul style="list-style-type: none"> <li>Define work</li> <li>Recall the formula for power</li> <li>Describe energy</li> </ul>
Analyzing	<b>EP.2.2 Examine the relationship between power sources</b> <i>Example:</i> <ul style="list-style-type: none"> <li>Describe the difference between weight, mass, and force</li> <li>Use equations to find missing information pertaining to work, energy and power</li> <li>Compute the efficiency of a machine</li> </ul>
<b>Indicator #3: Understand the transmission of energy &amp; power</b>	
<b>Bloom's Taxonomy Level</b>	<b>Standard and Examples</b>
Understanding	<b>EP.3.1 Understand how a mechanical system operates</b> <i>Example:</i> <ul style="list-style-type: none"> <li>Classify power trains as being either direct or indirect</li> <li>List the various parts of a power train</li> <li>Identify the parts of a power train</li> </ul>
Applying	<b>EP.3.2 Understand the types of simple machines</b> <i>Example:</i> <ul style="list-style-type: none"> <li>Construct an example of a simple machine</li> <li>Classify the various types of levers and give an example of each</li> <li>Compute the mechanical advantage of various simple machines</li> </ul>
Understanding	<b>EP.3.3 Understand both liquid and gas forms of power transmission</b>

	<p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• List the various forms of fluid power</li> <li>• Examine results from actions applied on liquids and gases</li> <li>• Understand the laws that govern fluids</li> </ul>
Understanding	<p><b>EP.3.4 Understand the laws that govern electricity</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• State Ohm's Law</li> <li>• Match symbols to quantities</li> <li>• Define electrical quantities</li> </ul>
<b>Indicator #4: Understand alternative energy</b>	
<b>Bloom's Taxonomy Level</b>	<b>Standard and Examples</b>
Understanding	<p><b>EP.4.1 Understand the sources of alternative energy</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• Compare and contrast the types of alternative energy sources</li> <li>• Prepare a presentation on synthetic fuels</li> <li>• List possible alternative energy sources</li> </ul>
Analyzing	<p><b>EP.4.2 Analyze the sources alternative of energy</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• Explain the environmental pros and cons for any one of the alternative energy sources</li> <li>• Present an oral presentation over one of the alternative energy sources</li> <li>• Construct a model of an alternative energy apparatus</li> </ul>
<b>Indicator #5: Implement safety with power technology</b>	
<b>Bloom's Taxonomy Level</b>	<b>Standard and Examples</b>
Applying	<p><b>EP.5.1 Examine safety issues relating to mechanical systems</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• Follow safety rules relating to moving mechanical systems</li> </ul>

	<ul style="list-style-type: none"> <li>• Explain the proper method of lifting</li> <li>• Observe and follow all lab safety rules</li> </ul>
Applying	<b>EP.5.2 Employ safety practices with fluids</b>  <i>Example:</i> <ul style="list-style-type: none"> <li>• Follow all safety rules relating to high-pressure lines</li> <li>• Demonstrate the proper cleanup method for fluids</li> <li>• Know proper storage methods for flammable/toxic liquids</li> </ul>
Understanding	<b>EP.5.3 Identify fire classification and extinguishers</b>  <i>Example:</i> <ul style="list-style-type: none"> <li>• Identify the types of fires</li> <li>• List which extinguisher will fight which type of fire</li> <li>• Identify the locations of fire extinguishers in the lab</li> </ul>
Applying	<b>EP.5.4 Employ safety practices with electricity</b>  <i>Example:</i> <ul style="list-style-type: none"> <li>• Operate and use proper personal protective equipment</li> <li>• Follow all safety rules based on <i>Occupational Safety and Health Administration</i> standards</li> <li>• Develop policies for the lab based on various emergency situations</li> </ul>
<b>Indicator #6: Understand scientific concepts for energy &amp; power technology</b>	
<b>Bloom's Taxonomy Level</b>	<b>Standard and Examples</b>
Understanding	<b>EP.6.1 Understand how energy converts from one form to another</b>  <i>Example:</i> <ul style="list-style-type: none"> <li>• Recall the concept of the Law of Conservation of Energy</li> <li>• Differentiate between potential and kinetic energy</li> <li>• Identify the sources of energy</li> </ul>
Understanding	<b>EP.6.2 Understand the categories of energy.</b>  <i>Example:</i> <ul style="list-style-type: none"> <li>• Classify the various energy sources</li> <li>• Recall the various methods of transferring energy</li> </ul>

	<ul style="list-style-type: none"> <li>Identify how various energy sources are used</li> </ul>
Understanding	<p><b>EP.6.3 Understand that an engine performing work does exhaust thermal energy that cannot be retrieved to the surroundings</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>Compare the efficiency of various types of light bulbs</li> <li>Compare the efficiency for multiple energy sources</li> <li>Define the Law of Thermodynamics</li> </ul>
Understanding	<p><b>EP.6.4 Understand which energy sources can be renewable and non-renewable</b></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>Provide examples of renewable energy sources</li> <li>Provide examples of nonrenewable energy sources</li> <li>List methods that are being used to conserve energy</li> </ul>